MODERN LABORATORY DIAGNOSTICS OF RHEUMATIC AND AUTOIMMUNE DISEASES

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According to the modern classification, rheumatic diseases (RD) belong to the continuum of human immunoinflammatory diseases, in the pathogenesis of which autoimmunity and autoinflammation associated with genetically determined and induced environmental factors (infections, smoking, etc.) defects in the activation of the acquired and innate immune response play a key role [1, 2].

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The main goal of laboratory diagnosis of RD is to obtain objective information about the presence and nature of immunopathological changes in the examined patient, which is an important tool for early diagnosis, assessment of activity, severity, prognosis of the disease and the effectiveness of therapy [12,13].

The clinical informativeness of laboratory tests is determined by calculating the operational characteristics of the test (diagnostic sensitivity and specificity - DC and DS, predictive value of positive and negative results, likelihood ratio of positive and negative results - LRPR and LROR) and using ROC analysis. The most useful for diagnosing RD are laboratory tests with ODPR>5 and ODOR2 and ≤5, ODOR>0.2 and ≤0.5; those with no benefit - with OPPR≤2 and OPPR>0.5 [15,16].

An important task of standardizing laboratory diagnostics of RD is the comparison and harmonization of immunological tests with international and national reference materials (certified reference materials) and research methods, databases on the reference limits of analyzed biomarkers, and algorithms for assessing the results

obtained.

Serological tests associated with the detection of circulating autoantibodies occupy a central place in the laboratory diagnosis of RD.

In autoimmune RDs, autoantibody testing is carried out primarily to confirm the diagnosis in patients with an insufficient number of clinical manifestations [18].

Detection of autoantibodies in the absence of clinical signs is not sufficient to make a diagnosis of an autoimmune disease. An increase in the frequency of detection of autoantibodies has been noted in elderly and senile people, while taking medications, with viral and bacterial infections, malignant neoplasms, and in healthy relatives of patients with autoimmune diseases [16,17].

When assessing the clinical significance of autoantibodies, it is necessary to take into account the persistence and severity of their overproduction. In infections, moderate transient formation of autoantibodies is observed, and in autoimmune diseases, persistent, pronounced overproduction is observed [15].

Autoantibodies specific to only one RD are very rare. Autoimmune diseases are characterized by the simultaneous presence of several types of autoantibodies in one serum, the so-called autoantibody profile, the assessment of which significantly increases the diagnostic value of determining these biomarkers.

Nonspecific immune disorders (hyperimmunoglobulinemia, decreased complement concentration) may indirectly indicate the development of systemic RD and serve as indications for the study of autoantibodies. The main diagnostic laboratory markers of RD are antinuclear antibodies (ANA), rheumatoid factor (RF), antibodies to citrullinated proteins (ACP), antineutrophil cytoplasmic antibodies (ANCA), antiphospholipid antibodies (APL). A list of primary (screening), secondary (confirmatory) and additional serological tests for the diagnosis of autoimmune RDs has been developed [4,5,6,9,10,11,12,13,14].

The most useful markers of the acute phase response in RD are ESR and C-reactive protein (CRP). The most useful markers of acute phase response in acute respiratory infections are ESR and C-reactive protein (CRP). Other laboratory biomarkers of RD (cytokines, markers of endothelial activation, immunoglobulins, immune complexes, cryoglobulins, components of the complement system, lymphocyte subpopulations, genetic markers, indicators of bone and cartilage metabolism, markers of apoptosis, etc.) have less clinical significance compared to autoantibodies and indicators of the acute phase of inflammation [1,2,3].

Other screening methods for ANAs, such as enzyme-linked immunosorbent assay (ELISA) and new solid-phase analysis techniques, increase the rates of false-negative and false-positive results and cannot replace IIF testing. Patients with positive ANA results should undergo confirmatory tests for specific ANAs using methods like ELISA, immunoblotting, and double immunodiffusion [7,8,9].

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